depositing aluminum on the copper;

patterning and etching the aluminum so that the aluminum overlies only areas filled with copper.

7. (Once Amended) The method of claim 6 wherein the same mask used to pattern the dielectric layer is used to pattern the aluminum.

Please **cancel** claim 8, without prejudice.

9. (Once Amended) The method of claim 7 wherein a barrier material is deposited atop the copper before the aluminum is deposited and patterned.

10. (Once Amended) The method of claim 11 wherein the thickness of the copper and the thickness of the aluminum are adjusted so that the completed interconnect line has a first predefined electrical resistance within the range of 0.012 to 0.008 Ω per unit length.

Please enter the following **new** claim:

11. The method of claim 1 wherein the copper has a thickness within the range of 0.3 to 2.0 μm and the aluminum has a thickness within the range of 0.5 microns to 3.0 μm.

## REMARKS

The Examiner is thanked for his thoughtful review of applicants' application and his detailed response thereto.

The election of claims 6 through 10 for continued prosecution made by Timothy Croll is affirmed by this amendment. Claims 1 through 5 have been cancelled. New claim 11 has been added. Support for this claim is found in paragraph 18 of the specification.

The Examiner has rejected claims 6 through 10 under 35 U.S.C. §103 as unpatentable over the combination of A. McTeer, U.S. Patent No. 5,939,788 (McTeer) and K. Robinson et al., U.S. Patent No. 6,054,172 (Robinson).

The present invention describes a method for fabricating interconnect lines from a combination of aluminum and copper, with aluminum forming the upper layer of the composite interconnect line. Using aluminum as the upper layer allows for easy bonding using known methods for creating such bonds. As applicants stated in the "Summary of the Invention" section, bond pads require an aluminum layer and the present invention eliminates the need for a special process step to fabricate an aluminum layer on a copper interconnect. The present invention also allows for primary benefit of copper interconnect lines (low resistance per unit length) to be realized without the expense typically associated with forming thick copper lines.

Both references cited by the Examiner, McTeer and Robinson, describe methods that are properly considered as part of the prior art that applicants have described in the "Background of the Invention" section of their application. Neither reference even hints at a two layer interconnect line with the upper layer being aluminum, not copper. It is important to note that whatever aluminum layers are mentioned in McTeer and Robinson serve as barrier layers or bonding layers between the semiconductor and the copper. They make no real contribution to the overall resistance of the interconnect line and they are always beneath the copper layer.

McTeer, in all its different embodiments, only describes methods of depositing a thick copper layer on top of a barrier layer and an aluminum wetting layer. The interconnects in McTeer are made primarily of a thick layer of sputtered copper. Although McTeer achieves a low resistance interconnect, all the problems the present invention discussed with relation to depositing a thick layer of copper (see present invention's Specification, page 2, paragraph 6) are still present. There is no suggestion McTeer that the thickness of copper can be reduced if a thick layer of aluminum is layered over the copper interconnects. McTeer also provides no teaching or even a suggestion that placing aluminum over the copper would have a purpose. In contrast, applicants, by layering aluminum over copper to create the interconnects, realize a less expensive process to fabricate the interconnects and simultaneously eliminate another separate process to coat the copper with aluminum to create bonding pads, as copper cannot yet be directly bonded to. McTeer is thus firmly within the prior art that applicants described in their application (see present invention's Specification, paragraphs 3 through 6) and does not make any element of the amended claims obvious.

Robinson provides several methods for the electroless deposition of cooper on a titanium-containing surface of a substrate. Robinson is quite similar to McTeer and similarly does not envision forming the interconnects from a combination of aluminum and cooper. Most significantly, Robinson does not even mention the possibility of making the top layer of the

interconnect, along its entire length, from aluminum. Thus neither McTeer or Robinson anticipates the present invention. Their combination does not make the present invention obvious as there is no suggestion in the references to fabricate interconnect lines from a composite alloy of copper and aluminum, with aluminum forming the top layer of the interconnect.

Applicant believes that all pending claims are allowable and respectfully requests a Notice of Allowance for this application from the Examiner. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at the telephone number set out below.

Respectfully submitted,
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6. (Once Amended) A method for fabricating low resistance interconnect lines in an integrated circuit, the method comprising the steps of:

patterning and etching a dielectric layer in an integrated circuit;

filling the etched areas of the dielectric layer with **[a first conductive material]** **copper**;

depositing **[a second conductive material]** **aluminum** on the **[first conductive material]** **copper**;

patterning and etching the **[second conductive material]** **aluminum** so that the **[second conductive material]** **aluminum** overlies only areas filled with the **[first conductive material]** **copper**.

7. (Once Amended) The method of claim 6 wherein the same mask used to pattern the dielectric layer is used to pattern the **[second conductive material]** **aluminum**.

9. (Once Amended) The method of claim **[8]**7 wherein a barrier material is deposited atop the copper before the aluminum is deposited and patterned.

10. (Once Amended) The method of claim **[8]** 11 wherein the thickness of the copper and the thickness of the aluminum are adjusted so that the completed interconnect line has a first predefined electrical resistance **within the range of 0.012 to 0.008 Ω per unit length**.